Product Safety Assessment

DOW™ Diethylene Glycol Phenyl Ether Products

Select a Topic:

Names

- CAS No. 104-68-7
- Diethylene glycol phenyl ether
- Diethylene glycol monophenyl ether
- DOW™ DiEPh
- DOW™ DiEPh Technical
- DOW™ EPh Basic

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Product Overview

- DOW™ diethylene glycol phenyl ether (DiEPh) is a colorless liquid with a mild odor. Dow manufactures several commercial products that contain DiEPh, including DOW DiEPh Technical and DOW EPh Basic, which are ethylene glycol ether blends whose major component is diethylene glycol phenyl ether. It has high polymer solvency properties along with a low evaporation rate and a high flash point. For further details, see Product Description.
- The hazards associated with DOW DiEPh products differ significantly due to the presence of caustic soda (caustic, NaOH) in the DOW EPh Basic. For more information on the hazards associated with caustic, see the Product Safety Assessment for caustic soda.
- DOW DiEPh products are effective coalescents (polymer film-forming aid).[1,2] These products are used as coalescents in water-based latex architectural and industrial coatings, and latex adhesives. They are also used as solvents and plasticizers for cellulose-based materials and many vinyl, phenolic, alkyd, and ester-type resins in water-based coatings and printing inks.[3] For further details, see Product Uses.
- Eye contact with DOW™ EPh Basic (which contains caustic) may cause severe irritation with corneal injury, possibly resulting in permanent impairment of vision or even blindness. Chemical burns to the eye may occur following contact with DOW EPh Basic. Brief skin contact may cause severe burns. Swallowing DOW EPh Basic may result in burns of the mouth and throat.
- Eye contact with DOW DiEPh Technical (which does not contain caustic) may cause moderate eye irritation and corneal injury and possible permanent impairment of vision. Prolonged skin contact is not likely to cause significant irritation. Repeated skin contact may result in absorption of harmful amounts. For further details, see Health Information.
- At room temperature, exposure to vapors of DOW DiEPh Technical and DOW EPh Basic is minimal due to low volatility. Vapor from heated DOW™ DiEPh products may cause respiratory irritation or other effects.[4] For further details, see Health Information or Physical Hazard Information.

- Worker exposure to DOW™ diethylene glycol phenyl ether (DiEPh) products is possible during manufacturing. Engineering controls and personal protection equipment greatly reduce occupational exposure potential. DOW DiEPh technical grade is not sold for direct consumer use. It is used in latex paint formulations, latex adhesives, and paint removers. Consumers may come into contact with this material when using products in which DOW DiEPh is a formulation component. For further details, see Exposure Potential.
- DOW DiEPh products are stable at typical use and storage temperatures. These products can oxidize at elevated temperatures, creating pressure build-up in closed systems. Avoid contact with strong acids, strong bases, and strong oxidizers.[5] For further details, see Physical Hazard Information.
- Diethylene glycol phenyl ether is biodegradable, unlikely to accumulate in the food chain, and is practically nontoxic to fish and other aquatic organisms. For further details, see Environmental Information.

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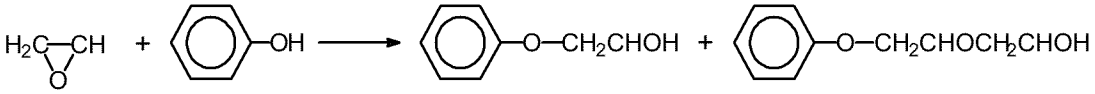
Manufacture of Product[6]

- **Capacity –** DOW diethylene glycol phenyl ether (DiEPh) products are manufactured at facilities in Freeport, Texas (USA). In 2004, global industry capacity for ethylene-series (E-series) glycol ethers was 952,000 metric tons (2.1 billion pounds). U.S. consumption of glycol ethers was 309,000 metric tons (682 million pounds).
- **Process –** Diethylene glycol phenyl ether is recovered as a byproduct from the manufacture of ethylene glycol monophenyl ether when two molecules of ethylene oxide combine with phenol rather than one. Although the reaction product is purified by distillation, both compounds are present in the final products. The reaction sequence is shown below.



Ethylene oxide | Phenol | Ethylene glycol phenyl ether | Diethylene glycol phenyl ether

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Product Description[7,8]

DOW™ diethylene glycol phenyl ether (DiEPh) is a colorless liquid with a mild odor. Dow manufactures several commercial products that contain DiEPh, including DOW DiEPh Technical and DOW EPh Basic, which are ethylene glycol ether blends whose major component is diethylene glycol phenyl ether. Components of the products include: diethylene glycol phenyl ether, ethylene glycol phenyl ether, and other reaction products. EPh Basic also contains up to 5% sodium hydroxide (caustic).

These products have excellent polymer solvency properties, have a low evaporation rate, and a high flash point.[9]

For more information about blend components propylene glycol phenyl ether (EPh) and caustic soda, see the relevant Safety Data Sheet or Product Safety Assessment.

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Product Uses[10,11]

DOW™ DiEPh Technical is appropriate for the following applications:

- Coalescent in water-based architectural and industrial latex coatings
- Solvent and plasticizer for nitrocellulose, cellulose acetate, ethyl cellulose, and many vinyl, phenolic, alkyd, and ester-type resins in water-based coatings
- Solvent for printing inks
- Component in formulation of stable metalworking fluids
- Coalescent for latex adhesives
- Intermediate for other chemicals

DOW EPh Basic is used in the following applications:

- Fuel
- Mining

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Exposure Potential[12]

Diethylene glycol phenyl ether products are used in the production of industrial and consumer products. Based on these uses for diethylene glycol phenyl ether, the public may be exposed through:

- **Workplace exposure** – Exposure can occur either in a diethylene glycol phenyl ether manufacturing facility or in the various industrial or manufacturing facilities that use this material. It is produced, distributed, and stored in closed systems. Those working with diethylene glycol phenyl ether in manufacturing, formulation, mining, or coating operations could be exposed during maintenance, sampling, testing, or other procedures. Each facility should have a thorough training program for employees and appropriate work processes, ventilation, and safety equipment in place to limit unnecessary exposure. See Health Information.
- **Consumer exposure to products containing diethylene glycol phenyl ether** – DOW™ diethylene glycol phenyl ether is not sold for direct consumer use, although it is used in some finished products that may be available to consumers. Always read the product information before use and follow the label/use instructions. See Health Information.
- **Environmental releases** – Diethylene glycol phenyl ether may be released to environment as a component of products available to the consumer (*e.g.*, water-based latex paint formulations, paint removers). The substance has moderate solubility in water, and once introduced, it will tend to remain dissolved in water. Diethylene glycol phenyl ether is biodegradable and will be removed by sewage treatment plants. In the event of a spill, the focus is on containing the spill to prevent contamination of soil and surface or ground water. Absorb spilled material with a noncombustible absorbent such as clay or Zorb-all. Collect in suitable and properly labeled containers and dispose of properly. See Environmental, Health, and Physical Hazard Information.
- **Large release** – Industrial spills or releases are infrequent and generally contained. If a large spill does occur, dike the area to contain the spill. Collect recovered material in suitable and properly labeled containers for recycle or disposal. Use appropriate safety equipment. See Environmental, Health, and Physical Hazard Information.
- **In case of fire** – Keep people away and deny unnecessary entry. Extinguish fires with water fog or fine spray, dry-chemical or carbon-dioxide extinguishers, or foam. Alcohol-resistant foam is preferred. Use of a direct water stream may spread the fire. Fight the fire from a protected location or safe distance. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

For more information, see the relevant Safety Data Sheet.

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Health Information[13]

Eye contact – Eye contact with diethylene glycol phenyl ether may cause moderate irritation with moderate corneal injury. Effects may be slow to heal. Diethylene glycol phenyl ether may cause permanent impairment of vision. Eye contact with DOW™ EPh Basic (contains caustic) may cause severe irritation with corneal injury, which may result in permanent impairment of vision, even blindness. Chemical burns may occur.

Skin contact – Prolonged skin contact to DOW DiEPh Technical is not likely to cause significant irritation. If material gets trapped under clothing or in gloves, the response may be more severe. Prolonged skin contact is not likely to result in absorption of harmful amounts; however, repeated skin contact may result in absorption of harmful amounts. Excessive exposure to a similar substance has resulted in hemolysis, thereby impairing the blood's ability to transport oxygen. Brief contact with DOW EPh Basic may cause severe skin burns. Symptoms may include pain, severe local redness, and tissue damage in addition to the effects noted for DOW DiEPh Technical.

Inhalation – At room temperature, vapors of DOW DiEPh products are minimal due to low volatility. Based on information from similar substances, vapor from heated material or mist may be hazardous on single exposure.

Ingestion – Diethylene glycol phenyl ether itself has low toxicity if swallowed. Small amounts swallowed incidental to normal handling are not likely to cause injury; however, swallowing larger amounts may cause injury. Swallowing DOW™ EPh Basic may result in burns of the mouth and throat and gastrointestinal irritation or ulceration due to the hazards associated with caustic.

Repeated exposure – In animals, prolonged overexposure to a similar substance has affected the blood, kidney, liver, and thyroid.

For more information on products containing diethylene glycol phenyl ether, see the relevant Safety Data Sheet.

For more information about blend components ethylene glycol phenyl ether (EPh) and caustic, see the relevant Safety Data Sheet or Product Safety Assessment.

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Environmental Information[14]

Environmental properties of the predominant components of DOW™ DiEPh Technical Grade are presented below.

Diethylene glycol monophenyl ether – Diethylene glycol monophenyl ether has very low volatility and is moderately soluble in water. When introduced to water, the chemical will have a tendency to remain in water. It has minimal tendency to bind to soil or sediment. Diethylene glycol monophenyl ether is moderately biodegradable under aerobic conditions and will be removed by sewage treatment plants. The chemical has a low potential to accumulate in the food chain and is practically nontoxic to fish and other aquatic organisms on an acute basis.

Ethylene glycol monophenyl ether – Ethylene glycol monophenyl ether has very low volatility and is moderately soluble in water. When introduced to water the chemical will have a tendency to remain in water. It has minimal tendency to bind to soil or sediment. Ethylene glycol monophenyl ether is unlikely to persist in the environment. The compound is readily biodegradable, which suggests it will be rapidly and completely removed from water and soil environments, including biological wastewater treatment plants. Ethylene glycol monophenyl

ether has a low potential to accumulate in the food chain and is practically nontoxic to fish and other aquatic organisms on an acute basis.

The Organisation for Economic Co-operation and Development (OECD) Screening Information Data Set (SIDS) Initial Assessment Profile for ethylene glycol phenyl ether (EPh) concluded that the chemical has a low hazard profile and, thus, is currently of low priority for further work. This document may be accessed at http://www.chem.unep.ch/irptc/sids/OECDSIDS/122996.pdf.

Additional environmental information for ethylene glycol phenyl ether is available in the *Ecological and Toxicological Data of DOW Glycol Ethers* brochure.

For more information about blend components ethylene glycol phenyl ether (EPh) and caustic, see the relevant Safety Data Sheet or Product Safety Assessment.

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Physical Hazard Information[15]

Diethylene glycol phenyl ether is stable at typical use and storage temperatures. Store away from direct sunlight and avoid prolonged exposure to heat and air. Do not distill this material to dryness. This material can oxidize at elevated temperatures, creating pressure build-up in closed systems.

Avoid contact with strong acids, strong bases, and strong oxidizers.

For more information, see the relevant Safety Data Sheet.

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Regulatory Information

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of diethylene glycol phenyl ether. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Safety Data Sheet, Product Information Sheet, or Contact Us.

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Additional Information

- Safety Data Sheet (http://www.dow.com/webapps/msds/msdssearch.aspx)
- Contact Us (http://www.dow.com/oxysolvents/contact/index.htm)
- *Diethylene Glycol Phenyl Ether, Technical Grade,* Product Information, The Dow Chemical Company, Form No. 110-01207-0308, 2008 (http://www.dow.com/PublishedLiterature/dh_0275/0901b80380275d83.pdf?filepath=oxysolvents/pdfs/noreg/110-01207.pdf&fromPage=GetDoc)
- *Ecological and Toxicological Data of DOW Glycol Ethers*, The Dow Chemical Company, Form No. 110-00761, March 2004 (http://www.dow.com/webapps/lit/litorder.asp?filepath=oxysolvents/pdfs/noreg/110-00761.pdf&pdf=true)
- Chinn, Henry, "Glycol Ethers," *Marketing Research Report: Chemical Economics Handbook,* SRI Consulting, July 2004

For more business information about DOW™ diethylene glycol phenyl ether products, visit the Dow Oxygenated Solvents website at www.dow.com/oxysolvents/prod/eseries.htm.

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References

[1] *Diethylene Glycol Phenyl Ether, Technical Grade, Material Safety Data Sheet,* The Dow Chemical Company, ID No. 1003484/1001, Version 4.0, December 1, 2008, pages 1 and 4.
[2] *Diethylene Glycol Phenyl Ether, Technical Grade,* Product Information, The Dow Chemical Company, Form No. 110-01207-0308, 2008, pages 1–2.
[3] *Diethylene Glycol Phenyl Ether, Technical Grade,* Product Information, The Dow Chemical Company, Form No. 110-01207-0308, 2008, page 2.
[4] *Diethylene Glycol Phenyl Ether, Technical Grade, Material Safety Data Sheet,* The Dow Chemical Company, ID No. 1003484/1001, Version 4.0, December 1, 2008, pages 1–2 and 5.
[5] *Diethylene Glycol Phenyl Ether, Technical Grade, Material Safety Data Sheet,* The Dow Chemical Company, ID No. 1003484/1001, Version 4.0, December 1, 2008, pages 4–5.
[6] Chinn, Henry, "Glycol Ethers," *Marketing Research Report: Chemical Economics Handbook,* SRI Consulting, July 2004, pages 13–14 and 18.
[7] *Diethylene Glycol Phenyl Ether, Technical Grade, Material Safety Data Sheet,* The Dow Chemical Company, ID No. 1003484/1001, Version 4.0, December 1, 2008, pages 1, 2 and 4.
[8] *Diethylene Glycol Phenyl Ether, Technical Grade,* Product Information, The Dow Chemical Company, Form No. 110-01207-0308, 2008, pages 1–2.
[9] *PPH, Basic Material Safety Data Sheet,* The Dow Chemical Company, ID No. 1010291/1001, Version 5.0 February 24, 2009, pages 1 and 4.
[10] Dow's Oxygenated Solvents website – E Series Glycol Ethers (http://www.dow.com/oxysolvents/prod/eseries.htm).
[11] *Diethylene Glycol Phenyl Ether, Technical Grade,* Product Information, The Dow Chemical Company, Form No. 110-01207-0308, 2008, page 2.
[12] *Diethylene Glycol Phenyl Ether, Technical Grade, Material Safety Data Sheet,* The Dow Chemical Company, ID No. 1003484/1001, Version 4.0, December 1, 2008, pages 2–3.
[13] *Diethylene Glycol Phenyl Ether, Technical Grade, Material Safety Data Sheet,* The Dow Chemical Company, ID No. 1003484/1001, Version 4.0, December 1, 2008, pages 1–2 and 5.
[14] *Diethylene Glycol Phenyl Ether, Technical Grade, Material Safety Data Sheet,* The Dow Chemical Company, ID No. 1003484/1001, Version 4.0, December 1, 2008, pages 5–6.
[15] *Diethylene Glycol Phenyl Ether, Technical Grade, Material Safety Data Sheet,* The Dow Chemical Company, ID No. 1003484/1001, Version 4.0, December 1, 2008, pages 3 and 4–5.

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